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AUTHOR Powell, Jack Vaughan
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ABSTRACT

The feasibility of computer applications in teacher education programs and growing importance to educational professionals of knowledge of computers provide a framework which justifies the need for a computer utilization survey course in the teacher education curriculum. Instructional management systems to keep records and to monitor student progress are increasing, and the use of computers in the classroom is just beginning to develop. Teachers need to understand and to be able to use computer resources which are available to them. One study in higher education revealed that computer applications have made little progress in the humanities. A computer assisted instruction course on statistics and test construction was favorably evaluated by most of the teacher education students enrolled. A concise, nontechnical introduction to the use of computers in education is a viable alternative to the direct acquisition of computer skills. (CH)

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CAN A COMPUTER UTILIZATION SURVEY COURSE BE JUSTIFIED IN A CURRICULUM FOR PUBLIC SCHOOL TEACHERS?

JACK VAUGHAN POWELL, PH.D.
UNIVERSITY OF GEORGIA

This article addresses a need which is based on the author's training and experience in computer applications at Forida State University, resulting in a recent appointment to the Committee on Computer Utilization (College of Education) at the University of Georgia.

An informal survey conducted by the committee reveals that only a few courses in the area of computer science are being offered in the College of Education at the University of Georgia. Most of them are very technical in nature and are only attracted to graduate students who are pursuing a concentration in the field of computer science; however, it is predicted that many people who are graduating from teacher preparation programs today will eventually be employed in public school systems where their immediate instructional environment will be highly affected by the influence of computer technology. What implications does this have for curriculums in teacher preparation? An answer to this question is that a nontechnical course in computer applications should become integral to a curriculum in teacher education; thus, enabling the general educational practitioner to secure the skills needed to function in such environment, or at least be able to communicate with more specialized technicians. With this in mind, the purpose of this article is to justify the need for a course in Educational Uses of the Computer which is based on some dynamic developments in the field.

As a whole, computer utilization has had a significant impact upon our society during the past two decades, but the demand for it seems to

be continuously growing in the field of education. While educational change becomes more apparent, there exists a vital concern for educators to examine curricular offerings in terms of relevance and applicability to present and future needs. It is predicted that computer usage in terms of information processing, data management, direct instruction, and program management will become the major focus in education resulting in a preparatory course offering for public school teachers. It is, therefore, imperative for such experience to be included in a university curriculum which services teacher educators; thus, making available a survey course that will enable one to perform relative tasks, or at least feel comfortable within an environment influenced by computer technology.

Due to cost factors, economic considerations, and implementation problems, many public school districts only have minimum (if any) access to a computer facility. In such cases, the application is usually connected with batch processing, standardized test scoring, or research activities at the central office level. Other school districts, however, have implemented computerized management systems which have direct influence on the instructional process. For example, the Instructional Management System (IMS) of the System Development Corporation was designed for public schools which recognized a need for having information on the rate of student learning, problems encountered in the process, and the availability of instructional resources. With these goals in mind, IMS undertook a mission by which diagnostic and prescriptive data could be made available in order to improve instruction. The New York Institute of Technology also developed a management system

for individualizing learning which is called the Automated Instructional Management System (AIMS). The underlying purpose of AIMS is to provide analyses and evaluative feedback on the progress of students.

Another computerized management system for individualization was developed under the auspices of the University of Pittsburgh R & D Center. Individually Prescribed Instruction Management and Information System (IPI/MIS) was developed as a means of individualizing instruction while utilizing feedback from the system in order to improve procedural operations. In addition, Project PLAN (Program for Learning in Accordance with Needs) being very comprehensive in nature, was initially developed with public education in mind. Since 1967, this computerized management system has been widely implemented in public school districts in the United States. According to Brudner (in Hobson, 1970), over 4,000 students in both primary and secondary grades were benefiting from the system within one year after the inception of Project PLAN. The major concern of this project is to recommend an instructional program in conjunction with a set of corresponding teching-learning units for each student.

The 110 public schools comprising Pinellas County, Florida have replaced more than fifty years of records by various microfilming and data processing techniques. During the first six months of project operation, approximately 20,000 inactive student records were processed which resulted in a reduction of mass student records by 300 to one.

Tuscarawas Valley Education Service Center in the Appalachia area is now servicing 141 schools through a computer facility which is housed in a former elementary school building located near

New Philadelphia, Ohio. Equipped with model classrooms so that administrators can examine new teaching procedures, the center is providing supplementary services to public, private, and parochial schools in six eastern Ohio counties. Audio-visual supplies and data processing equipment are also available.

Edmund A. Bowles (1971) of IBM conducted a survey on computer utilization to identify people "known or presumed to be teaching courses intended primarily or incidentally for humanities students (p. 35)." According to this study, twenty-eight courses were reported at twenty-two institutions of higher education. The author further explains that "with three or four known exceptions, this represents the sum total of computer instruction in the humanities (p. 35)." In addition, six respondents indicated that they were teaching survey courses in the humanities, and the others were conducting discipline-oriented courses sponsored by various departments. Nine of these were offered through departments of computer science; approximately eighteen seemed to offer courses in "direct" computer contact. The majority of the 19 courses were offered for both undergraduate and graduate credit; seven were for graduate level students and two were for undergraduates.

Based on the Bowles survey, two major conclusions were determined: (1) computer applications have made little progress in the humanities, and (2) with the exception of a few cases, the existence of the course at the institution depends upon a few interested people. When a professor leaves a particular university and accepts a job elsewhere, his course goes with him, and the pre-established interest at a former university diminishes; therefore, continuity cannot be provided without

faculty members who have interest and skills in computer technology.

The twenty-eight courses reported in the survey suggest an entry point for computerized instruction in humanities. With noticeable commitment and determination, this application can be extended beyond the realm of the humanities into other divisions or departments where programs are planned and engineered for the general educational practitioner.

A look at the international scene reveals that a pilot project in Staffordshire (England) has given thirty secondary schools direct access to the ICL System 4-50 computer located at Staffordshire College of Technology. By installing teleprinter terminals in a small group (ten) of schools each term, 1,000 children became knowledgeable of computing aspects during the first year. Teachers at the schools were given courses in basic computer techniques and programming. Courses in computer appreciation, with an emphasis on modern applications, were available for students. The Staffordshire project is presently being extended to all schools in the area by implementing permanently linked (on-line) terminals to the 4-50 system.

Another effort to bridge the gap between the classroom and the computer world has been made possible through Computer Education in Schools (CES), a Hoskyns Group's Project, launched by ICL which is a major computer manufacturer in Britain. At the beginning of the 1969-70 academic term, 1,200 children from twenty-seven schools began to use CES teaching packages while additional requests were made from more than 2,000 other schools. CES is based on an assumption that computer technology needs to be introduced into the schools without making

investments in expensive equipment. The instructional package contains units on programming techniques for pupil and teacher, a basic primer, teacher's guide, and a testing service for the program.

In addition, the impact of PLATO (Programmed Logic for Automatic Teaching Operation) is carrying forceful significance in terms of computer-assisted instruction (CAI). For more than a decade, experiments in CAI have been undertaken at the University of Illinois. This experimentation has been concerned with applications in the elementary school and instruction on the university level. To cite a few examples, the Stanford Laboratory is offering Russian Language instruction in CAI. There is also a variety of other applications in other fields such as library science, chemistry, algebra, nursing, foreign languages, geometry, engineering, and biology. It is also worth noting that PLATO has evolved from one terminal contact to a rather elaborate experimental classroom with more than twenty instructional stations controlled by computer. Meanwhile, an access of twelve stations have become available in remote locations. The student's station is equipped with a cathode-ray tube connected to a keyboard (Johnson, 1971).

The Hobson study (1970) reports findings on "the design, development, and prototype implementation of a computerized management system as a subcomponent of the Florida State University's proposed model for training elementary teachers (p. ii)." Problems examined were relative to the establishment of a data base and a system for instruction. Nineteen elementary education majors were involved in a field-trial study for a period of three weeks. Experiences encountered were typical of the emphasis placed upon individualized instruction as viewed by the

proposed operational model for preparing elementary teachers. During the investigatory period, the participants became involved in the selection of specified tasks with accompanying resources, provisions for instructing school-age children, examinations through manual procedures and teletype terminal operations, and the utilization of teletype terminals for entering data from the described encounters.

Based on empirical evidence revealed by computer output in terms of records, tests, and questionnaire responses, Hobson reports the following generalizations:

1. A computer managed instruction system is technically feasible for use with approximately 1,000 trainees.
2. The volume of data expected to be generated by the model requires computer processing for trainee scheduling and testing as well as overall program management.
3. Projections of student loads and operational components for the computer system have been redefined.
4. Technical problems associated with the development and implementation of an on-line data acquisition and computer management system appear to be minimal (p. iii).

During my experience as an instructor in the Competency Based Teacher Education Program at Florida State University (1970-72), I had the opportunity to monitor, provide orientation, and conduct seminars for fourteen modularized evaluation units in CAI. The Department of Curriculum and Integrative Studies considered these units as being an important part of an undergraduate course in elementary teacher preparation. The students were given orientation in the regular classroom and at the computer facility. Time schedules

were made available for students to "sign on" for the program throughout a particular quarter while a pre-post test factor allowed a student to move through the units at his own pace. Content included the following topics:

1. Pretest/Posttest
2. Behavioral Objectives
3. Test Items
4. Precentile Ranks
5. Measures of Central Tendency
6. Normal Distribution
7. Correlation Coefficient
8. Validity
9. Reliability/Factors Affecting
10. Reliability/Interpretation
11. Standard Error of Measurement
12. Types of Tests
13. Test Norms/Intelligence Quotient
14. Standardized Test Information

Approximately 150 students were provided computerized instruction. All were class members of EED 405 - Classroom Organization and Pupil Evaluation. Ninety-five percent of the students made very favorable comments concerning the novelty of the computer environment and the contribution which was being made to their professional preparation.

Given the state of the art in computer cost, capped with various budgetary restrictions, a department or division responsible for preparing teachers might be somewhat hesitant about initializing a computer survey course, but making one available at least two quarters during an academic year could result in a worthwhile expansion of skills

and confidence as future teachers prepare for job opportunities. A course in computer utilization may be presented from a variety of focal points; however, a survey of current literature suggests that a very meaningful course for prospective teachers could be developed around the outline which follows:

I. Computers and Programming
   - A. Evolution of computers
   - B. Characteristics of the computer
   - C. Overview of programming and languages

II. Data Processing
   - A. The school computer center
   - B. Storing and processing data
   - C. Information files
   - D. Applications in data processing

III. Computer Centers and Information Systems
   - A. Regional centers for school districts
   - B. Statewide information systems
   - C. Computers in higher education

IV. Computers in the Instructional Environment
   - A. Computer assisted instruction
   - B. Computer managed instruction
   - C. Games and simulation
   - D. Terminals in teaching stations
   - E. Projects in direct instruction

V. Additional Uses
   - A. Problem solving
   - B. Classroom management
   - C. Guidance and counseling
   - D. Administrative applications

VI. Educational Research

A. Data coding
B. Elementary statistical computing
C. Testing

VII. Research and Development Projects

A. Program planning and review techniques
B. Educational resources information centers
C. Information retrieval

VIII. Social Factors

A. Impact on education
B. Impact on individuals

The thesis of this paper was to establish a framework in which to justify the need for a computer utilization survey course to be included in a teacher education curriculum. It has been previously shown that a course of this nature is not only feasible at the university level, but also an important addition to the knowledge of people who anticipate employment on the elementary-secondary levels.

The described computer applications express a general consensus among many educators who believe that computer technology has vital roles to play in education. As more technological advancements become evident, institutions of higher education must provide appropriate experiences in order to enable one to acquire the necessary expertise. In my opinion, a concise and nontechnical introduction to the ways in which computers are used in education is a viable alternative for the acquisition of needed skills. The success of this innovation depends, however, on the degree of interest exhibited by program directors and people with a background in computer science. These individuals should not only assume an active role in studying the logistics of curriculum

expansion, but also consider themselves as catalytic agents in institutionalizing the course. To achieve this goal, I suggest that teacher education institutions do the following: (1) develop several survey courses in computer utilization and provide methods, suggestions, and materials for teaching; (2) encourage in-service and secondary courses in computer utilization; and (3) recommend that the course be included in the undergraduate and/or graduate student's program of studies.

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